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HUMAN IMMUNO DEFICIENCY VIRUS AND TUBERCULOSIS COINFECTION AMONG PATIENTS ATTENDING HOLLEY MEMORIAL HOSPITAL OCHADAMU, OFU LOCAL GOVERNMENT AREA, KOGI STATE

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Abstract

Tuberculosis and human Immuno-deficiency virus co-epidemics remain a major public health challenge particularly in resource limited settings. This study determined the prevalence of HIV co-infection among TB patients and the risk factors among patients attending Holly memorial Hospital Ochadamu, Ofu L.G.A., Kogi State, Nigeria. Two hundred (200) patients participated in the research, out of which one hundred and seventy three (173) were already confirmed to be HIV positive. Sputum samples were collected by experts into sample bottles aseptically for Acid fast Bacilli test for Mycobacterium tuberculosis; while blood samples were collected by trained nurses from the same candidates by venepuncture into anticoagulated bottles for HIV screening to re- confirm their status. Questionnaires were also administered to obtain some important demographic data. Sputum smear microscopy was carried out to test for Acid Fast Bacilli. Rapid haemagglutination assay was carried out to re-confirm the HIV status of the patients. Results showed that Twenty seven (27) patients signifying 13.5 % were TB/HIV co-infected. There was significant ($p<0.05$) relationship between TB and HIV status of the patients and clinical symptoms (dry cough, cough with sputum, weight loss and fever). There is need to study Immuno-haematological indices (CD4 count, Full Blood Count and ESR) routinely to monitor TB and HIV patients on regular basis in order to reduce morbidity and mortality associated with the diseases.

Keywords: Tuberculosis; Human Immunodeficiency virus; Co-infection; Prevalenc; Hospital.

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1. Introduction

Tuberculosis (TB) and human immunodeficiency virus (HIV) co-epidemics remain a major public health challenge, particularly in resource limited settings (Tadess *et al.*, 2013). There were an estimated 1.1 million TB/HIV co-Infected patients worldwide in 2011, 79% of those cases were in Africa (WHO, 2012). There has been a strong link between *tuberculosis* (TB) and HIV, as they are both capable of disarming the host's immune responses. TB is the most common opportunistic disease which kills those infected with HIV (Modjarrad and Vermund., 2010). HIV co-infection also increases the risk of latent TB reactivation by 20-fold, and is the most powerful known risk factor for progression of *Mycobacterium tuberculosis* infection to active disease (Getahum *et al.*, 2010; Kwan and Ernst, 2011). In Nigeria, the majority of TB infections are caused by *M. tuberculosis* followed by *M. africanum* and *M. bovis*, and most importantly, the burden of the disease is the highest in Africa. Nigeria ranks top in Africa with respect to the burden of both TB and HIV infections. In 2007, the estimated proportion of TB cases that were coinfected with HIV was 27% (Dim, 2012).

To improve the diagnostic and intervention outcomes for TB/HIV co-Infection patients, world health organization (WHO) developed a framework of strategic collaborative activities to be performed as parts of health sector response to control co-epidemic (WHO, 2004). .

Furthermore, the global effort at controlling the disease through the Stop TB initiative has been seriously challenged by the human immunodeficiency virus (HIV) pandemic in developing countries. This is because, TB is associated with HIV infection; HIV-positive individuals are about 20 to 37 times more likely to develop TB when compared to HIV-negative individuals. Likewise, a TB patient who is coinfected with HIV (TB/HIV) is more likely to die, and when sputum positive (ss+), is more likely to transmit the infection (Dim, 2012).

Knowledge about HIV co-infection status among TB patients might help understand the spread of the dual infection and to monitor the performances of TB and HIV control activities (WHO, 2012).

This study determined the prevalence and risk factors of HIV co-Infection among Tuberculosis patients attending Holley Memorial Hospital Ochadamu, Ofu Local Government Area, Kogi State.

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2. Materials and Methods

2.1. Study Area and Population

This study was carried out at Holley Memorial Hospital, Ochadamu, Ofu L.G.A, Kogi state. Kogi State is located in the central belt of Nigeria on Latitude 7°48' 0"N and Longitude 6° 44' 0"E. The people have a mixed culture with farming as their major occupation. The hospital was founded as a Non-Governmental Organization (NGO) in 1950 by the Qua Iboe fellowship, a local Nigerian church in response to the needs of those suffering from leprosy in Nigeria. HMH is recognized by the Nigerian Government as a place of excellence in the treatment of Leprosy and Tuberculosis. The Department is run in partnership with the Leprosy mission international. Today however, the hospital has grown to be a large general hospital providing specialist services in surgery, maternity and obstetrics, orthopaedics, ophthalmics and caring for an increasing number of people suffering from TB and HIV/AIDS. A large out patients Department cares for the growing local population.

2.2. Inclusion/Exclusion Criteria

The inclusion criteria for the study subjects were HIV infected patients receiving antiretroviral treatment at the Holley Memorial Hospital Ochadamu during the period of the study (January to October 2015) who gave informed consent to participate in the study. The population groups covered during the study was adult men and women attending antiretroviral control (ARC) in the hospital. It is pertinent to mention that those healthy adult are the reproductive group and are therefore a good proxy for the general population in the determination of the prevalence of TB, HIV and TB/HIV coinfection. Patients that were too sick and unable to communicate were excluded from the study.

2.3. Sample Collection

Blood sample was collected from patients and transferred into an ethylene diamine-tetraacetric acid (EDTA) for HIV test, while sputum samples were obtained from each patient, thus each patient produced two sputum sample within an hour interval.

2.4. HIV Test

HIV test was carried out using rapid test kit Determine $^{(R)}$ (manufactured by Alere, San Dio. Callifonia) Start pack was used as confirmatory test.

Samples are collected from patients through venepuncture. The blood sample is centrifuged at 1500 rpm for 5 minutes to prepare the serum. HIV screening was carried out according to manufacturers' manual.

2.5. AFB Test

TB diagnosis was made based on the findings of acid fast bacilli by Zielneelson (ZN) staining. Sputum specimen we decontaminated by modified Petroff's methods using sodium hydroxide

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(NaOH) and then concentrated by centrifugation at 3000rpm for 15 minutes. After centrifugation it was examined by microscopy.

2.6. Statistical Analysis

Complete questionnaire were coded by numbers and entered in a computer software excel cross-checking and data cleaning was done the data was then transferred to statistical package for social science version 16 (Spss Inc Chicago, USA) and graph pad prism 5 for analysis. Chi-square test was used to test for differences in proportions. Student test was used to test for differences in means between two or more groups. All statistical test were considered significant if the two sided P-value (p) was <0.05

3. Results

Age Distribution of TB/HIV Co-infected Patients Attending Holley Memorial Hospital Ochadamu

Age distribution of TB/HIV co-infected patients attending Holley memorial hospital showed that out the 200 patients, 27 (13.5%) patients are TB/HIV co-infected (Table 1). Age group 21-years recorded coinfection rate of 4-5%.

Table 1: Age distribution of TB/HIV Co-infected Patients Attending Holley Memorial Hospital Ochadamu

Age	No of respondents	No positive		Prevalence %
0-10	12	0		0.0
11-20	22	4		2.0
21-30	51	8		4.0
31-40	67	10		5.0
41-50	27	2		1.0
51-60	13	1		0.5
61-70	4	1		0.5
71-80	4	1		0.5
81-90	00	00		0.0
91-100	00	00		0.0
Total	200	27		13.5

X^2 cal = 7; $\alpha = 0.05$; P = 0.00l

Gender Distribution of HIV/TB Co-infected Patients Attending Holley Memorial Hospital Ochadamu

Gender distributions of TB/HIV coinfected patients showed that 16 (8.0%) male are TB/HIV coinfected while 11(5.5%) female are TB/HIV coinfected (Table 2).

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Table 2: Gender Distribution of HIV/TB coinfected patients attending Holley memorial hospital ochadamu

Gender	No of respondents	No positive	No negative	Prevalence %
Male	85	16	69	8.0
Female	115	11	104	5.5
Total	200	27	173	13.5

X^2 tab = 1.005; P =0.00001; α= 0.05.

Distribution of TB/HIV Coinfection among Patients Attending Holley Memorial Hospital Based on their Marital Status

On the basis of marital status, 14 (18.2%) were single, 12 (10.3%) were married, 1 (3.3%) divorced (Table 3).

Table 3: Distribution of TB/HIV coinfection among patients attending Holley Memorial Hospital based on their marital status

Marital status	No of respondents	No positive	No negative	Prevalence %
Single	77	14	63	18.2
Married	117	12	105	10.3
Widow/widower	1	0	1	0.0
Divorced	3	1	2	3.3
Separated	2	0	2	0.0
Total	200	27	173	13.5

$\mathbf{X^2}$ = 4.05; p =0.0001; α = 0.005.

Educational Status of TB/HIV Co-infected Persons Attending Holley Memorial Hospital Ochadamu

The Educational status of respondents shows that out of 15 primary school certificate holders 1 (6.6%) was coinfected; 36 were up to secondary school level with 8 (22.2%) coinfected;, 21 had National Diploma certificate with 1 (5.0%) positive; 61 had NCE certificate with 8 (13.1%) positive; 54 were university graduate with 7 (13.0%) positive, while 13 had no formal education with 2 (15.4%) positive (Table 4).

Table 4: Educational status of HIV/TB coinfected patients attending Holley memorial hospital

Educ. Status	No of respondents	No positive	No negative	Prevalence %
Primary school	15	1	14	6.6
Secondary school	36	8	28	22.2
ND	21	1	20	5.0
NCE	61	8	53	13.1
Uni/graduate	54	7	47	13.0
No formal education	13	2	11	15.4
Total	200	27	173	13.5

X^2 tab = 6.05; P = 0.0001; α = 0.05.

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Occupational Distribution of TB/HIV Coinfected Patients Attending Holley Memorial Hospital Ochadamu

On the basis of occupational status of patients showed that 10 (17.5%) were businessmen/women; 6 (8.2%) were public servants; 1 (9.1%) were farmers; 1 (33.3%) were private business owners, while 9 (16.1%) were dependent (Table 5).

Table 5: Occupational distribution among TB/HIV coinfected patients attending holley memorial hospital ochadamu.

Occupation	No of respondents	No positive	No negative	Prevalence %
Businessmen/women	57	10	47	17.5
Public service	73	6	67	3.0
Farmer	11	1	60	9.1
Private	3	1	2	0.5
Dependent	56	9	47	16.1
Total	200	27	173	13.5

X^2 tab = 4.05; P = 0.0001; α = 0.05.

Clinical Signs of TB/HIV Coinfected Patents Attending Holley Memorial Hospital Ochadamu

Clinical sign of respondents attending Holley Memorial Hospital Ochadamu showed that 23 (85.2%) had cough with sputum; 24 (88.9%) had dry cough; 17 (63.0%) had fever; 9 (33.3%) had loss of weight; 3 (11.1%) had tiredness, but of the 27 patients with loss of appetite none was HIV/TB coinfected (Table 6). Other symptoms of HIV or TB were not displayed by the patients.

Table 6: Clinical Sign among TB/HIV Coinfected Patents Attending Holley Memorial Hospital Ochadamu

Clinical signs	No of respondents	No positive	No negative	Prevalence %
Cough with sputum	27	23	4	85.2
Drug cough	27	24	3	88.9
Fever	27	17	10	63.0
Weight loss	27	9	18	33.3
Tiredness	27	3	24	11.1
Loss of Appetite	27	0	27	0
Chest pain	0	0	0	0
Short breath	0	0	0	0
Swelling of the neck	0	0	0	0
Pneumonia	0	0	0	0
Diarhoea	0	0	0	0
Fungal infection of the skin	0	0	0	0
Night sweat	0	0	0	0
Total	162	76	86	46.91

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4. Discussion

This study revealed a mean TB/HIV co-infection of 13.5% (Table 1). This is does not agree with the higher prevalence of 34.5% mean coinfection reported for Enugu State in a similar study carried out by Dim (2012). At the community level, TB/ HIV transmission is more likely, and can substantially increase health-care costs, particularly for hospitalization to treat opportunistic infections and decrease productivity (Nachega *et al*., 2015). From table 6, there was significant relationship ($P<0.05$) between HIV/TB coinfection with clinical signs such as coughing with sputum and dry cough. As HIV progresses immunity declines, patients become more susceptible to infections such as TB, pneumonia, recurrent fungal infections of the skin and oropharynx. These infections can occur at any stage of progression of HIV infection and immune suppression. Some patients may develop constitutional symptoms (unexplained fever and weight loss) previously known as AIDS-related complex (ARC) or specific HIV related diseases occurring predominantly with severe immune suppression such as certain opportunistic infections (e.g. cryptococcal meningitis) and certain tumours (e.g. Kaposi sarcoma). At this late stage, it is sometimes known as "full-blown AIDS" (Deschamps *et al*., 2000; Corbette *et al*., 2003).

HIV increases susceptibility to infection with *M. tuberculosis* infection leading to TB disease. The risk increases with increasing immunosuppression. HIV increases not only the risk but also the rate of progression of recent or latent *M. tuberculosis* infection to diseases (Corbette *et al*., 2003).

The burden of tuberculosis (TB) in Nigeria is high, and unfortunately, the data from the TB programme of the States' ministries of health are usually unpublished, which possibly contribute to the prevailing ignorance and poor attitude of Nigerians to the disease (Dim and Dim, 2013).
In this study, TB/HIV coinfection was higher from the ages of 10 – 40 (Table 1). The prevalence was also higher in males than in females (Table 2). This does not agree with the observation of Dim and Dim (2013) in a similar study in Enugu State, who reported that the number of female TB cases was higher than males within the 0-14 age group only. The annual number of all TB cases showed a rising trend. The study therefore recommend that clinical symptoms and immunohaematogical indices (CD4 count, FBC and ESR) must be performed routinely to monitor TB and HIV patients on regular basis in order to reduce morbidity and mortality associated with the diseases. Future research should be conducted to identify strains of MTB in order to help prevent MDR cases among HIV patients.

5. Conclusion

TB/HIV coinfection was 13.5% among the patients as determined by sputum smear microscopy alone. There were significant relationships between TB and HIV status of the respondents and clinical symptoms (dry cough couogh with sputum, weight loss and fever). Female had more prevalence of TB/ HIV coinfected patients than males The highest rate of infection for both *M. tuberculosis* and HIV was among the age range of 25-69years.

The findings of this study were very important and could be used in the monitoring and management of TB and HIV coinfection.

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